

S.E.E.D.S.

Sustainable Early Education Development System

FOCUS



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A S.E.E.D.S. Community-based Education Presentation

Created by Applied Geography for Sustainable Living

Western Monarch *Butterfly*



Photo: Kathy Keatley Garvey/UC Davis

Sustainable Early Education Development System Presentation

S.E.E.D.S. / AC01-2018-02-01



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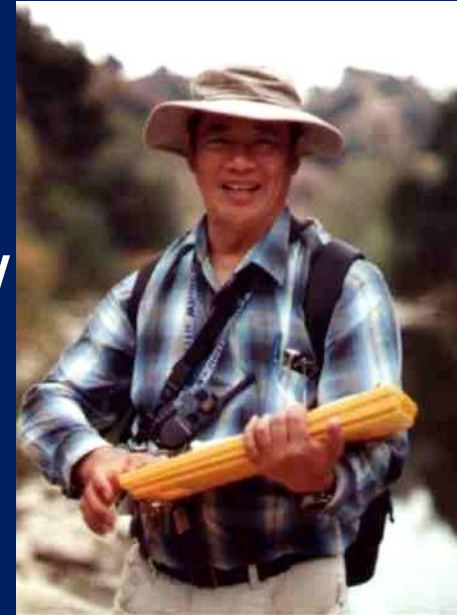
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Background Note

This lesson created as part of the S.E.E.D.S. Community-based Education “Amazing California” lesson series by Applied Geography for Sustainable Living.

This series highlights some of the unique flora, fauna, and geography of California



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<http://www.seedsforallkids.org/>

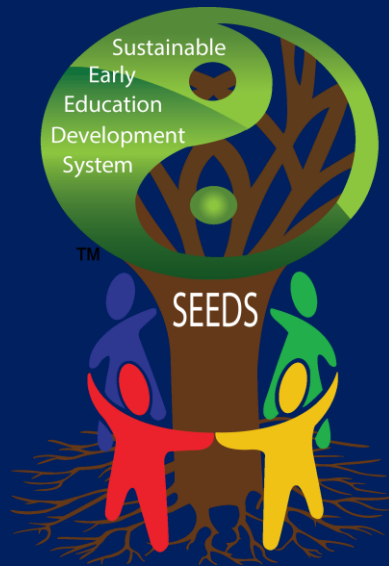
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Advisory Note

This lesson is formatted for viewing on a single computer screen by a few people.



For large group presentations, a narrator should read the slides with text not readily legible to the audience.



Photo courtesy of N7YLA



Assumptions

This lesson is developed based on these assumptions:

- Time is the most precious gift a person can give to a child.
- Children are natural learners because young children are curious and very keen observers.
- Nature and the outdoors is a natural school available to all, rich and poor alike.
- Developing a love for Nature and learning are firm foundations for developing a good decent human being.



If these assumptions do not apply to you, this presentation may not be suitable for you.

Food for Thought

"The more clearly we focus our attention on the wonders and realities of the universe about us, the less taste we shall have for destruction."



Rachel Carson

Scientist, Activist,
Biologist, Academic,
Journalist, Environmental
Activist, Scientist
(1907–1964)



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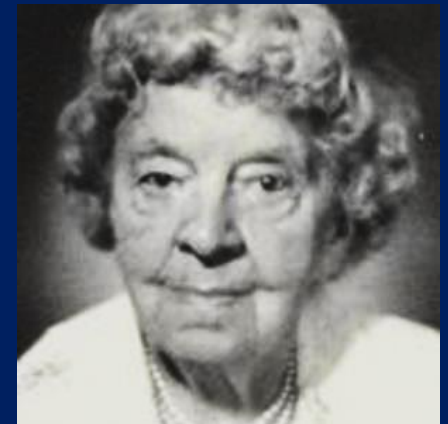
Food for Thought



“Children must be taught how to think, not what to think.”

Margaret Meade, American cultural anthropologist
(1901–1978)

“Go out, go out I beg of you
And taste the beauty of the wild.
Behold the miracle of the earth
With all the wonder of a child.”



Edna Jaques

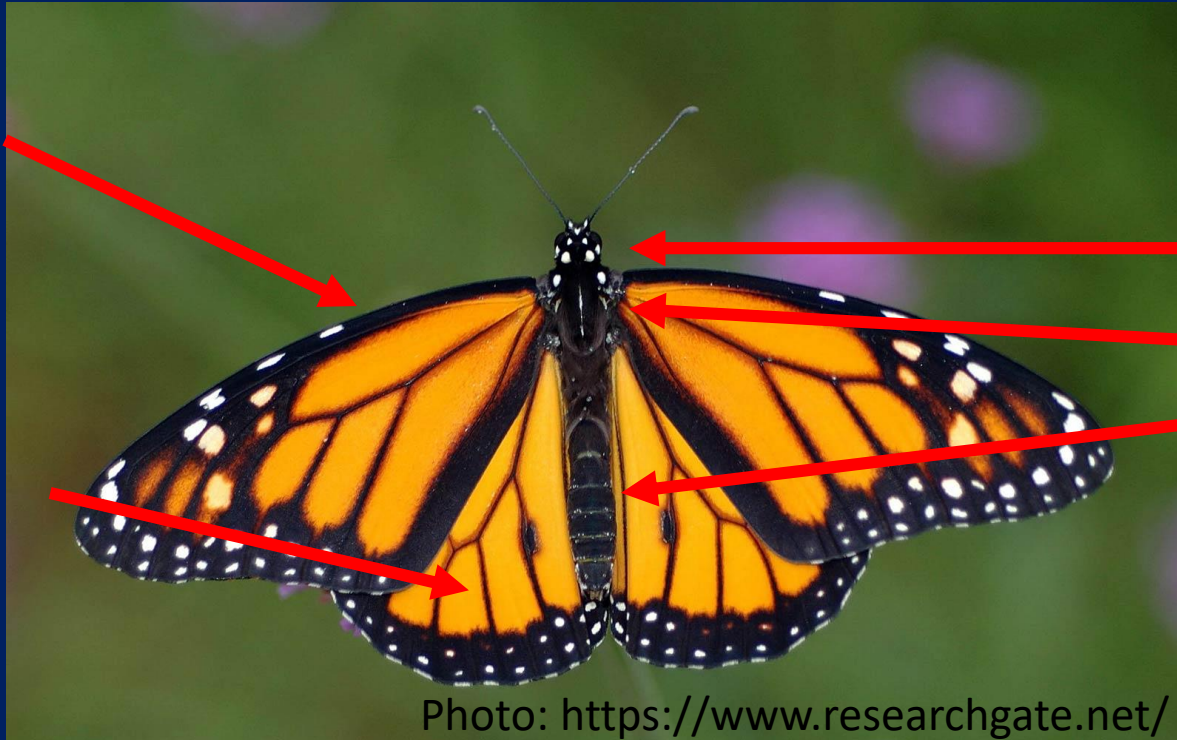
Canadian lecturer, author
and poet
(1891–1978)



What is a Butterfly?

Fore
Wing

Hind
Wing



- Head
- Thorax
- Abdomen

A butterfly is an insect. This means it has 3 basic body parts, 6 legs and usually 1 or 2 pairs of wings.



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Male vs. Female Monarch

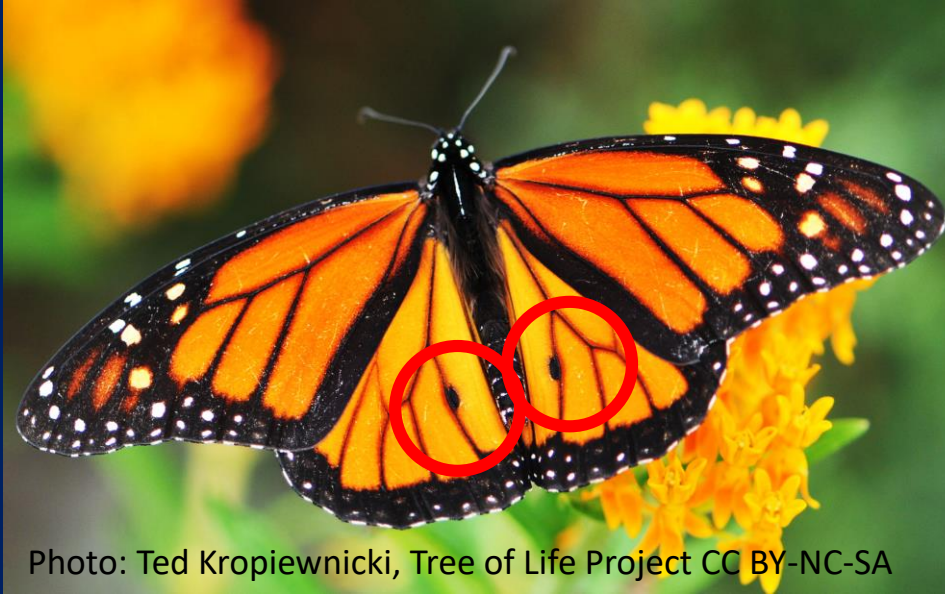


Photo: Ted Kropiewnicki, Tree of Life Project CC BY-NC-SA



(c) Kathy Keatley Garvey

You can tell a male Monarch by the dark spots on the hind wings.



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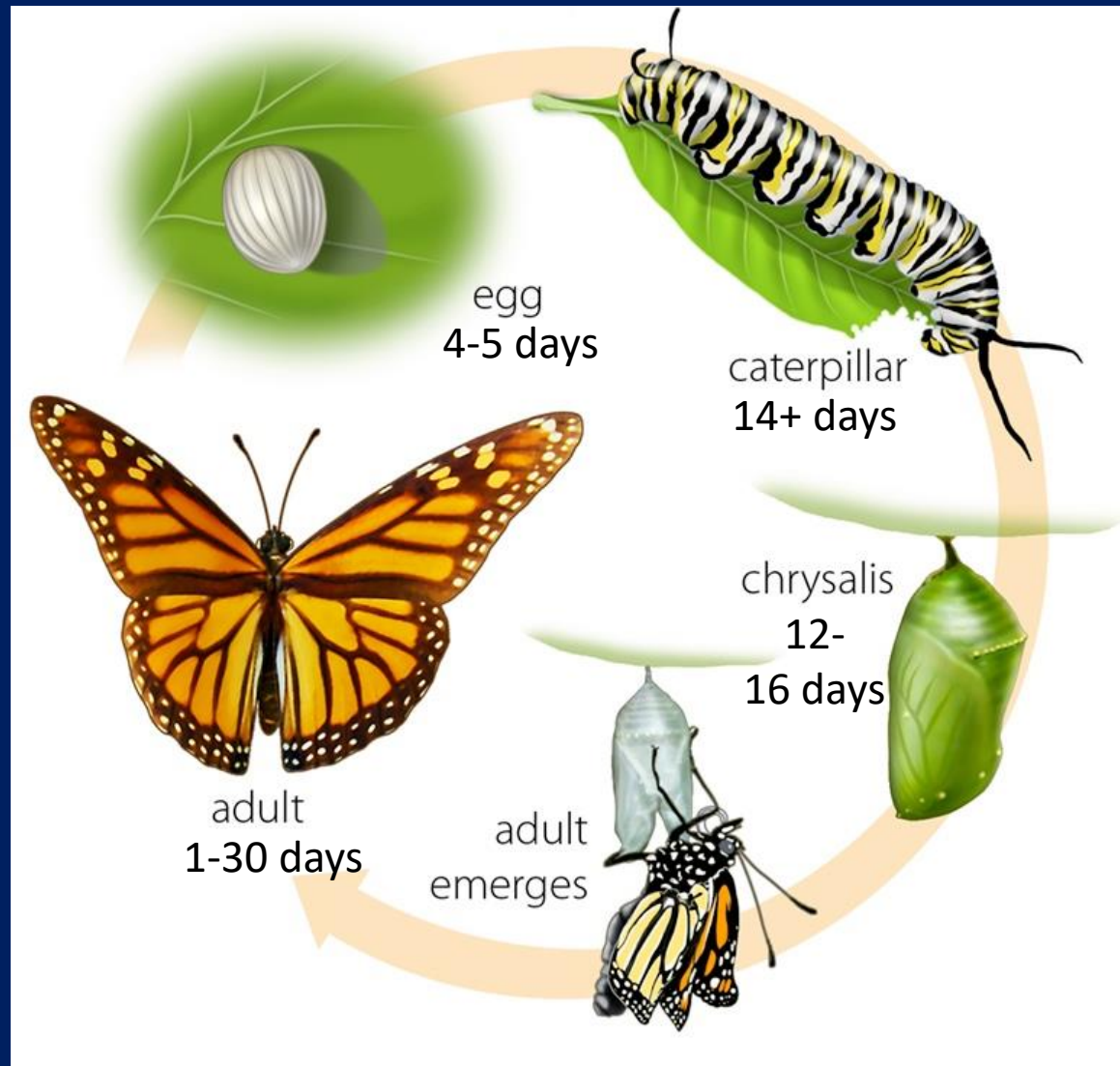
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Monarch Butterfly Life Cycle

The actual days for each part of the cycle varies depending on numerous environmental factors.



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Modified from <http://pulpbits.net>

Monarch Butterfly Eggs



Photo: Elizabeth Howard/Journey North)



Photo:
<http://animalia-life.club>



Photo:
<https://monarchlab.org>

Monarchs lay their eggs on the underside of milkweed leaves to hide them from predators. The eggs are about 0.9 mm in diameter and a bit more than 1.2 mm tall. In about 4-5 days, the egg turns dark. It will hatch soon.



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Monarch Butterfly Caterpillar

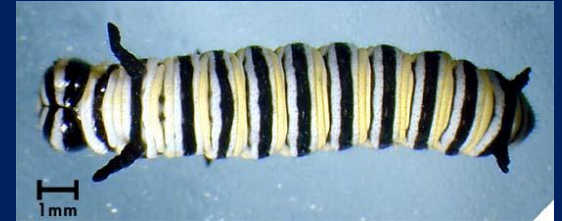
The caterpillar eats its egg case, then begins eating milkweed leaves. As it grows, it molts its skin, eats it, then eats more leaves. Each stage of growth is called an “instar”.

It takes about 14 days to be fully grown.

1st instar, 2-6mm



2nd instar, 6-9mm



3rd instar, 10-14mm



4th instar, 13-25mm



Photos: <https://www.monarchwatch.org>

5th instar, 25-45mm



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Monarch Butterfly Pupae



Photo: <https://www.monarch-butterfly.com/>

In the pupa stage, the caterpillar will begin the process of metamorphosis. This will take about 12-16 days.

It will form a chrysalis. Here, the caterpillar changes to become a butterfly. The chrysalis is unique to butterflies. (Moths make a cocoon; butterflies make a chrysalis.)



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Monarch Butterfly Pupae



Photos: <http://www.martydavisphotos.com>

The Monarch butterfly is developing in the chrysalis. The chrysalis starts off a bright green color. It begins to darken and you can start to see the black and orange colors of the wings.



Monarch Butterfly Emerging



Photo: <https://www.monarch-butterfly.com/>

Adult butterflies emerge from the chrysalis about mid-morning. They need about 3-4

hours to fully unfold their wings and let them harden before they can fly. They need the temperature to be about 55°F / 13°C before they can fly. Then it's off to find nectar.



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Monarch Butterflies Need Nectar



*Agastache
urticifolia*
(Horse Mint)



Arctostaphylos, Sunset Manzanita



Asclepias eriocarpa
California Monarch Milkweed &
Indian Milkweed



Asclepias fascicularis
California Narrowleaf
Milkweed & Narrow-Leaf
Milkweed

These are some of the native California nectar
plants for Monarchs.

Photos from various Internet sources under educational fair use clause.



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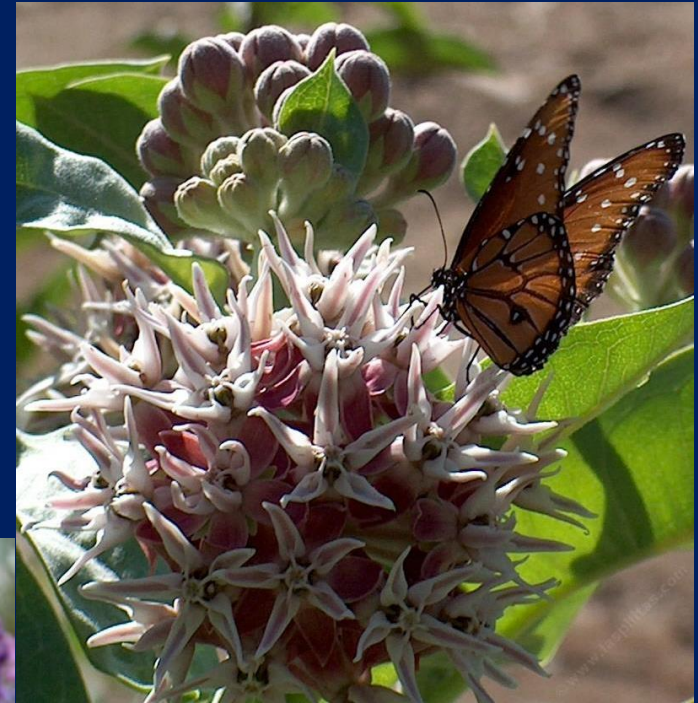
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Monarch Butterflies Need Nectar



Aster sp.



Asclepias speciose, California
Showy Milkweed, Greek
Milkweed & Common Milkweed



← *Trichostema lanatum*
Woolly Blue Curls, Romero and
Blue Curls

Monardella
(all species)

Photos of nectar
flowers on this
page are from
various Internet
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Caterpillars Need Milkweed Leaves



Asclepias eriocarpa
California Monarch
Milkweed &
Indian Milkweed



Asclepias fascicularis
California Narrowleaf
Milkweed & Narrow-Leaf
Milkweed



Asclepias speciosa, California
Showy Milkweed, Greek
Milkweed & Common Milkweed



← *Asclepias tuberosa*
Butterfly Weed

*Photos of these CA native Monarch larval
plants are from various Internet sources
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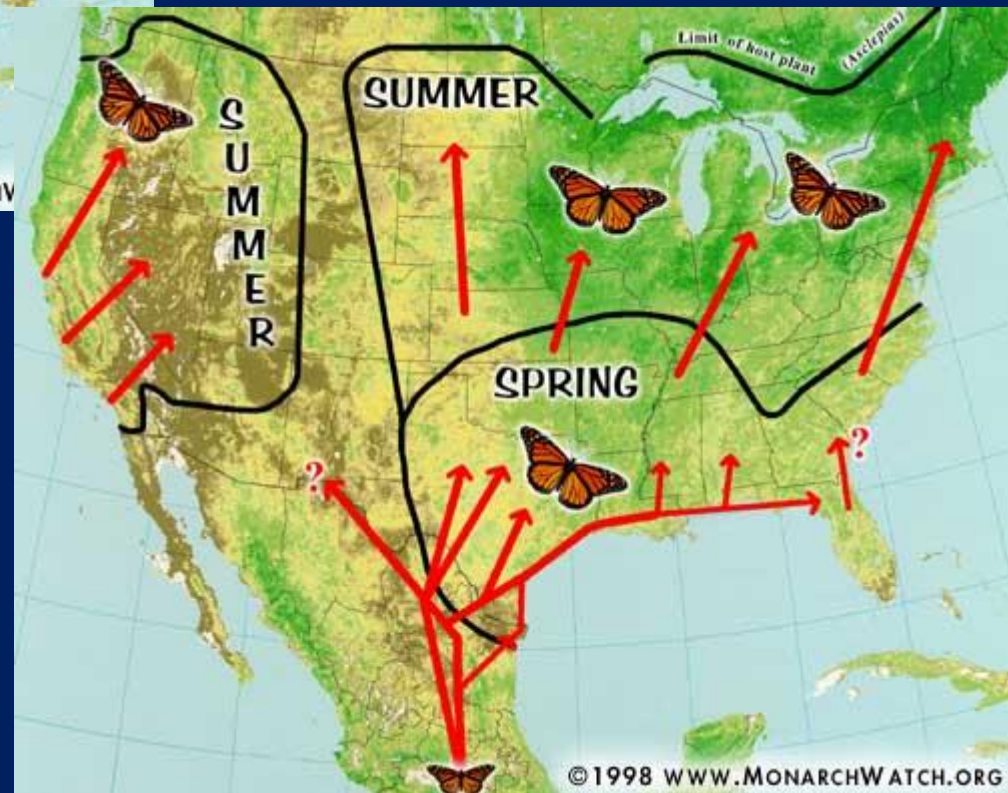
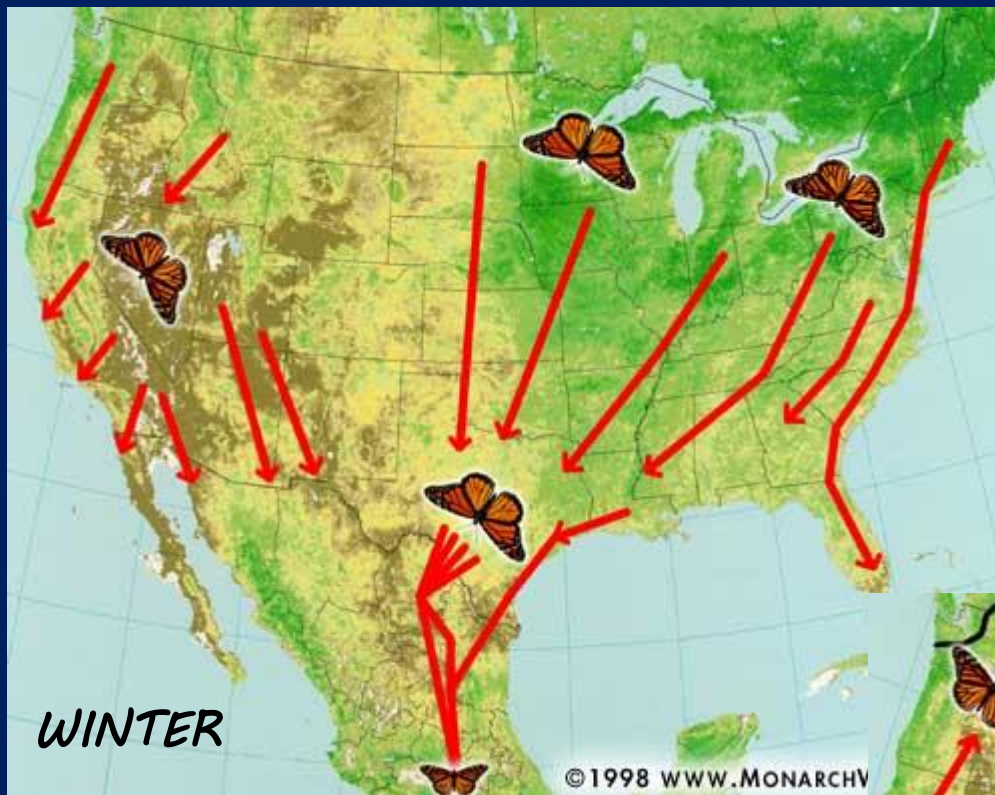
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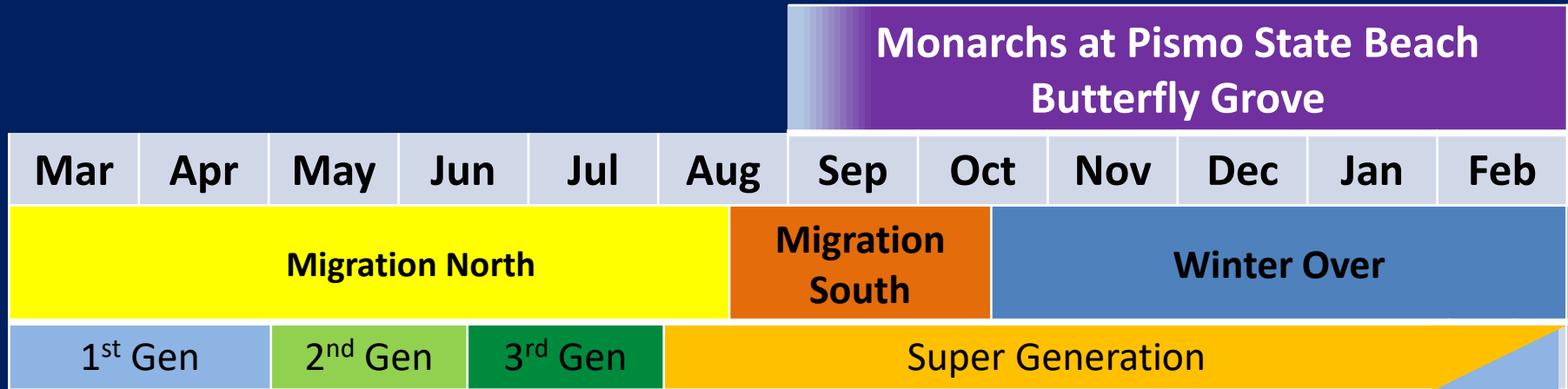
A Complete Migration Cycle Takes About 4 Generations



Monarchs migrate about 3000 mi/4800 km. They can travel anywhere from 50-100 mi / 80-160 km a day.



The Western Monarch Migration



This is an estimate of the generations of Monarchs involved in an annual migration. The timing of the breeding and generations can vary with environmental conditions along the migration route.



The Migration South

Monarchs migrate about 3000 mi/4800 km from the Rocky Mountains and Canada to spend winter at the Pismo State Beach Butterfly Grove. They can fly anywhere from 50-100 mi / 80-160 km or more per day and fly as high as 1 mile.



Scientists found out that the Fall migration takes 1 generation to complete. The “super generation” may live 16-48 weeks. None of the migrating Monarchs has ever been to Pismo Beach before.



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The Migration North

The northward migration will take 2-3 generations of Monarchs.

The trip north will mean the Monarchs complete 2-3 reproductive cycles before the last generation reaches the Rocky Mountains.

The group that arrives has never been there before.





The Pismo State Beach Butterfly Grove is one of several places where Western Monarch Butterflies spend the winter. This place is a grove of eucalyptus trees.



Simple Rules in the Grove

- Stay on the path.
- Don't step on butterflies.
- Don't disturb butterflies in the air, in clusters, or on the ground.
- Dispose of litter properly.
 - If you see litter, pick it up and help keep the grove clean.
- Stay off fences and railings.
- Take only photos & memories; leave only footprints.



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Welcome to the Pismo State Beach Monarch Butterfly Grove



For over 70 years, this grove has been the fall and winter home to thousands upon thousands of Monarch Butterflies. The migration which continues to bring them here today is a story of their life cycle, metamorphosis, survival, and ultimately their legacy of continued generations.

Hours of Operation

Monarch Butterfly Grove hours:	<i>daily from dawn to dusk</i>
California State Park Docents and Oceano Dunes District Volunteers are available for questions and operate the Monarch Mercantile:	<i>daily from 10:00 am to 4:00 pm (including all holidays through the last weekend of February)</i>
Butterfly Talks are scheduled:	<i>daily at 11:00 am and 2:00 pm</i>

To ensure a pleasant visit for both our winged and non-winged visitors, please:

- Watch your step!! Butterflies will often land in the paths to sun themselves or absorb heat from the ground.
- Do not handle or chase the butterflies. If you find an injured butterfly, please alert grove staff.
- Stay on the designated paths. Do not cross over fences or other barriers.
- Never remove butterflies (alive or dead) from the Grove.
- Refrain from running, screaming, & other disruptive behavior while in the Grove.

Please Watch Your Step!



Why Monarchs Spend the Winter Here?

You can use the Geographic Systems Model to help to find the answer.

We start with the three concepts:

- Location
- Scale
- Time

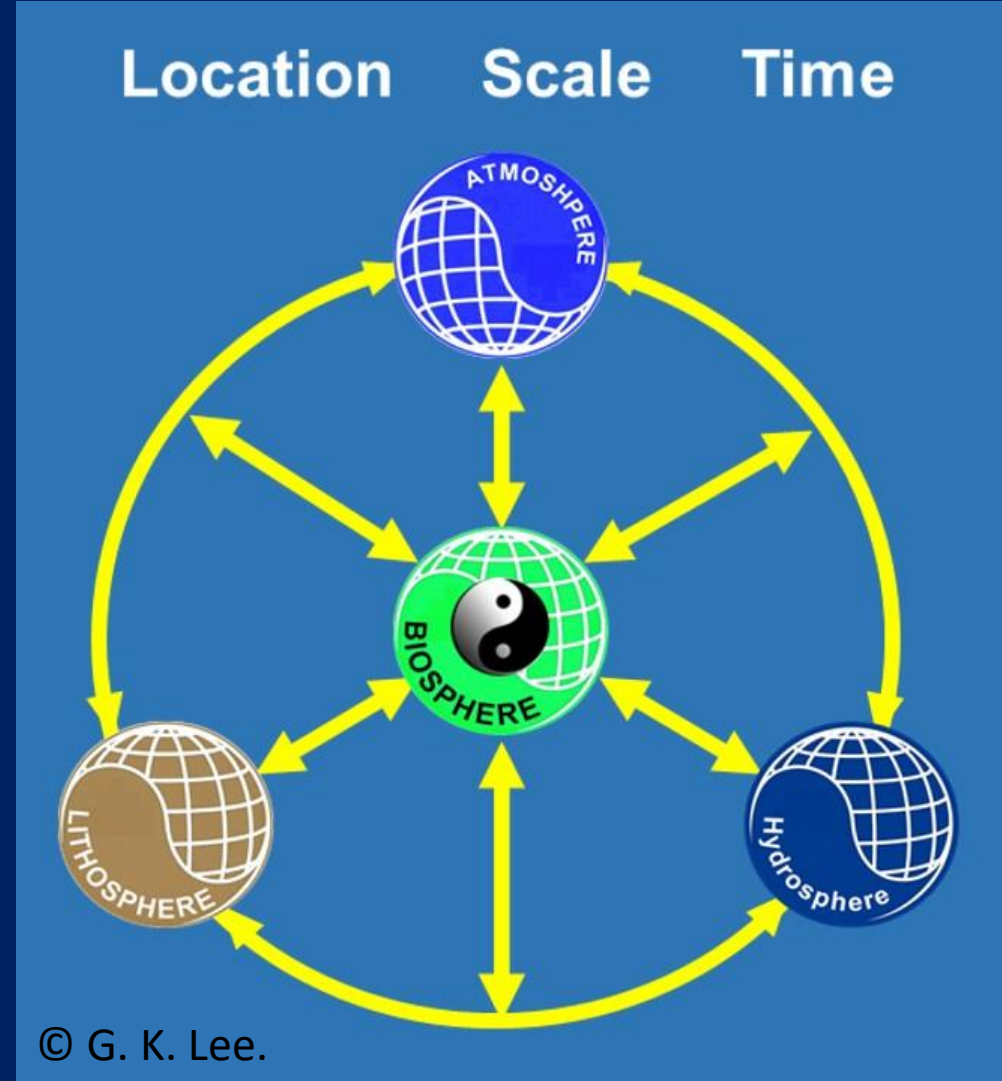


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Location: Pismo State Beach Park

Location is
another word
for place. In this
case, the place is
the Pismo State
Beach Butterfly
Grove

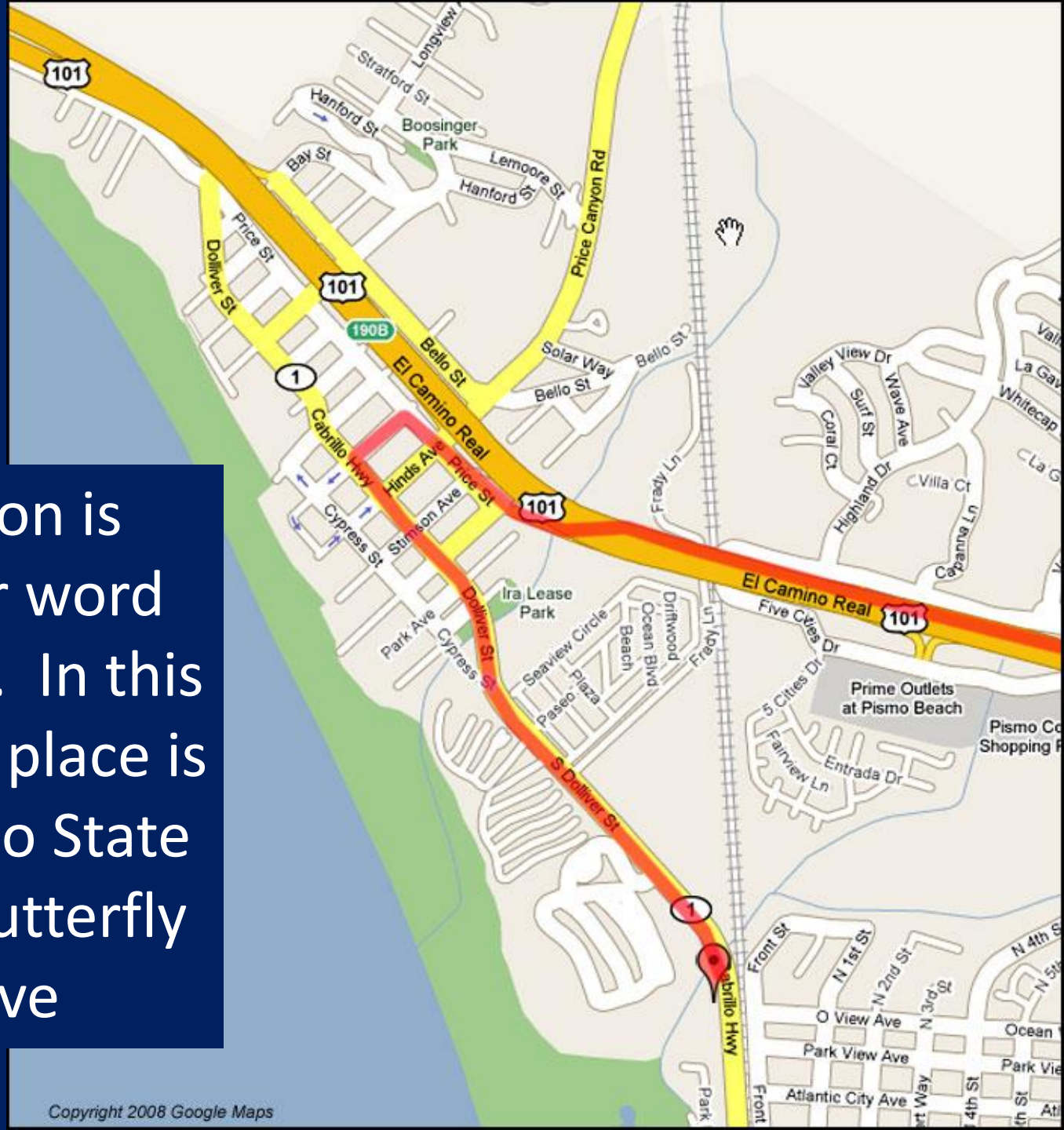


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Copyright 2008 Google Maps

Scale: (Size)

The grove is roughly triangular and covers about 500,000 sq. ft. or about 11.5 acres.

They take shelter in the trees. They find food and water nearby.

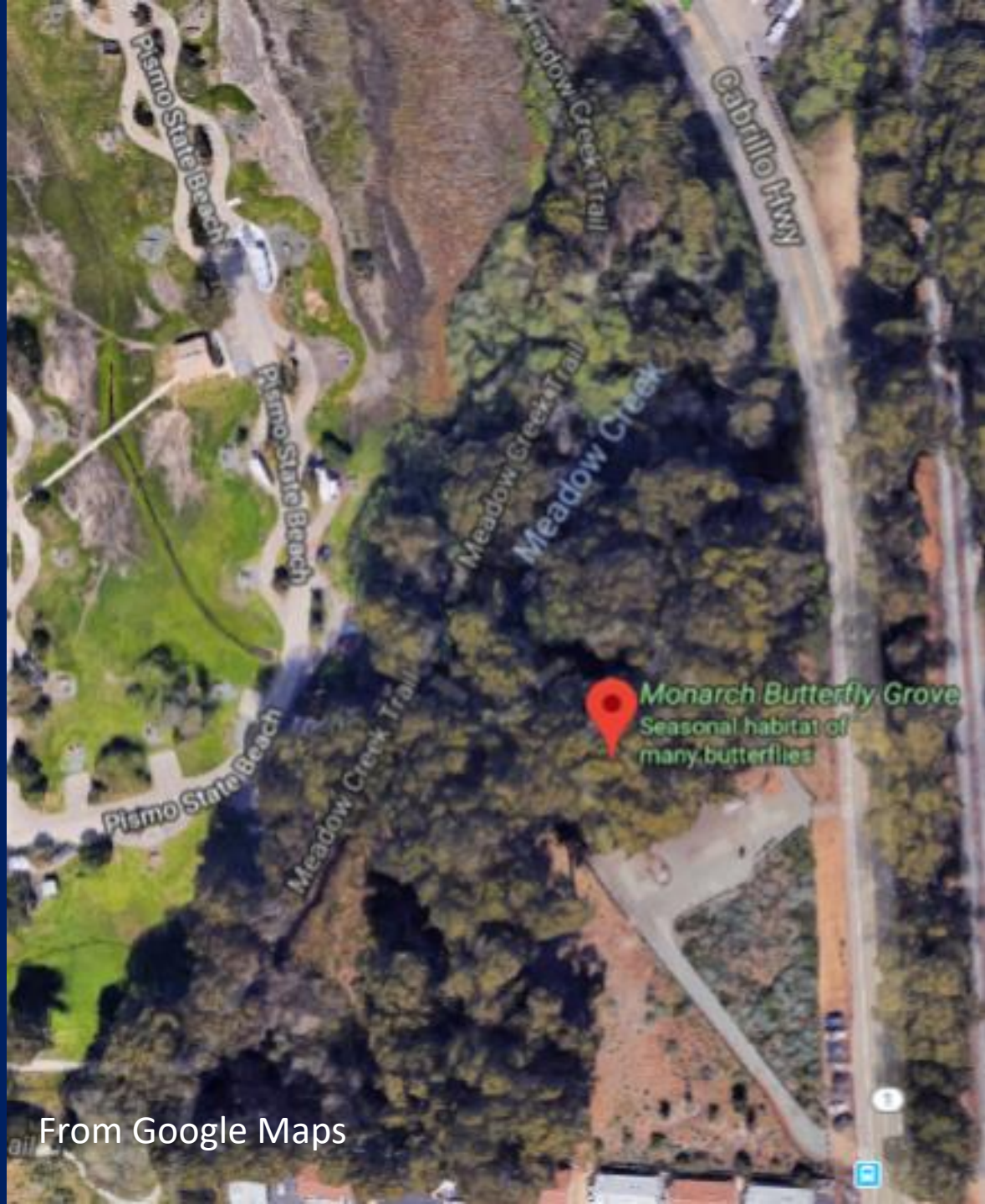


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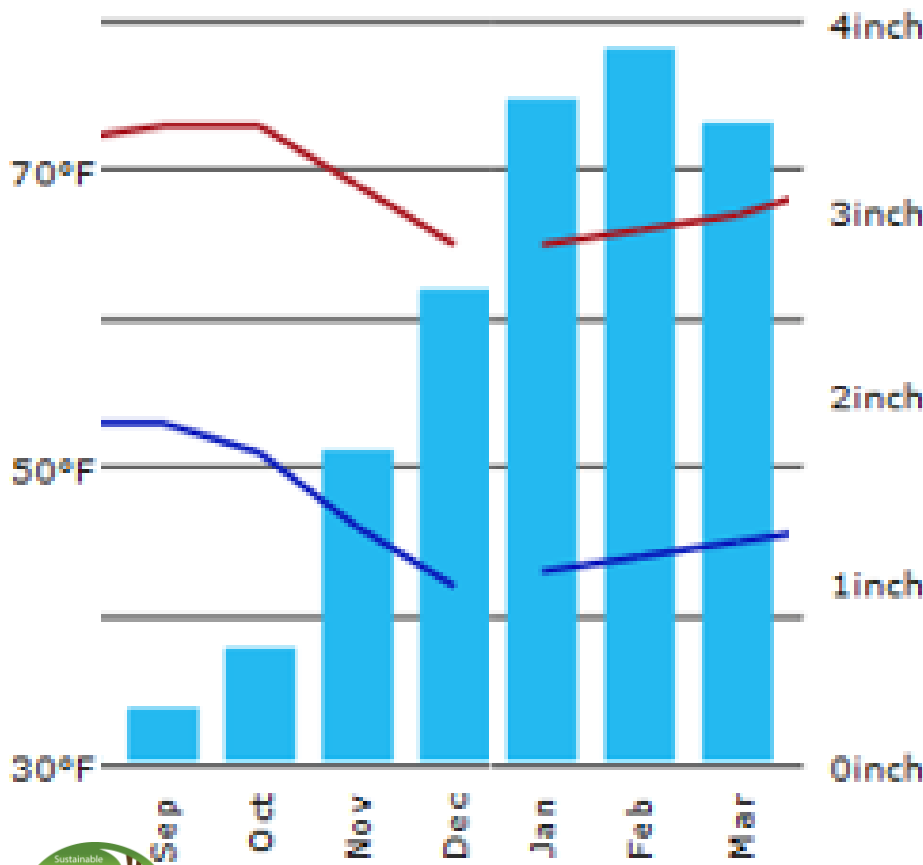
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From Google Maps

Time: Fall & Winter

The Monarchs come here to spend the winter. The mild temperatures in the grove keep the Monarchs from freezing. The cool temperatures slow down the use of their stored energy.



<https://www.usclimatedata.com>

Fall		Winter			Spring	
Sep	Oct	Nov	Dec	Jan	Feb	Mar
Monarchs Arrive		Monarchs Winter Over			Monarchs Depart	



Temperatures (about 55°F / 13°C) are warm enough for Monarchs to fly. Warmer temperatures seem to trigger the need to find food and mates.



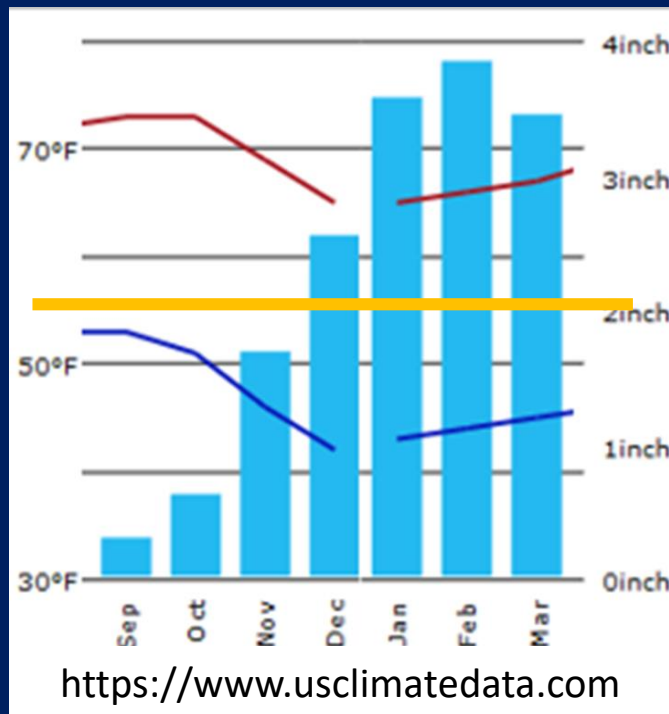
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55°F



When Do Monarchs Fly?



Fly?



Monarch butterflies will spend most of their time here clustered in trees. Clustering is an overwintering behavior that helps them conserve their energy so they can survive through the winter.

When monarchs do fly, they do so during the day when temperatures are approximately 55 degrees or higher.



Biosphere Checklist

All living organisms need:

- Shelter
- Water
- Food
- Space

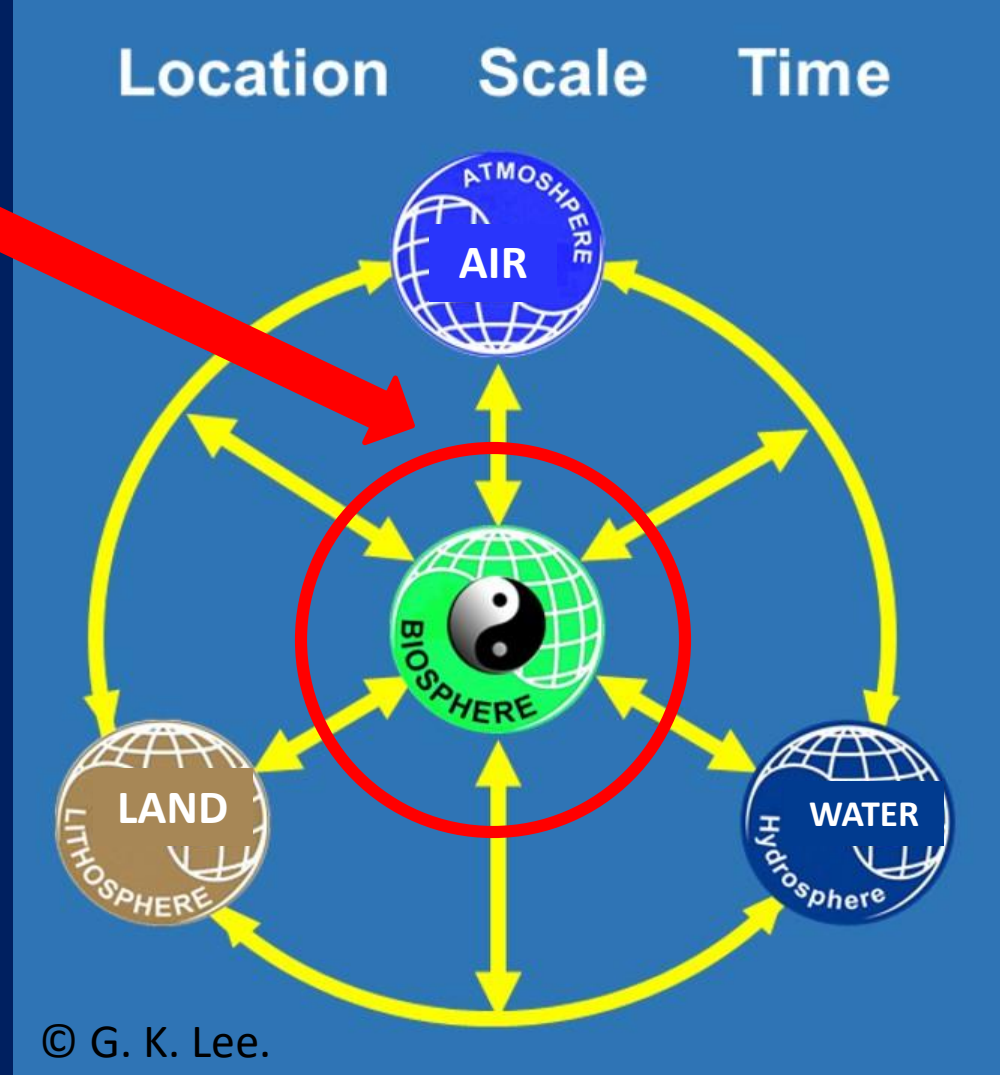


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They get these from their environment (air, land, water, and other living things).

The Pismo State Beach Butterfly Grove

provides the Monarchs with **shelter** from wind and rain. They can get **water** from the nearby stream. They can find **food** in nearby fields. Pismo Beach gives them **space** to find what they need to survive for the winter.



Pismo State Beach Butterfly Grove



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**Approaching the grove from the West
by crossing Meadow Creek.**

Monarch Cluster

Monarchs cluster on the tree leaves for **shelter**. The dull underside of their wings look like dried leaves.



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Photo: <https://www.tripadvisor.com/>

Meadow Creek

is a convenient **water** supply for the Monarchs. Other flowering plants in the area are nectar sources for their **food**. (Use the link below to learn about nectar plants for Monarchs.)



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FFI: <https://xerces.org/monarch-nectar-plant-guide-california-coast/>

Late Feb: Many Monarchs Have Left



The warmer temperatures stimulate feeding and mating. They are prepared for the northward migration.



Warm Temperatures

prompt Monarchs to feed and breed.

This creates the next generation to start the northward migration.



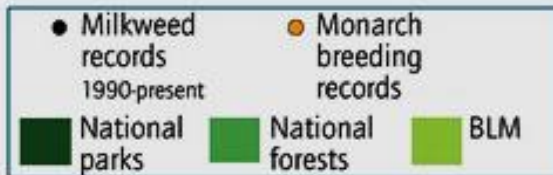
This Repeats 2-3 Times

until the Monarchs reach their summer home in the Rocky Mountains and parts of Canada. To successfully make this journey, they must find milkweed along the way. They stop, lay eggs, and die. The newly hatched generation continues northward.

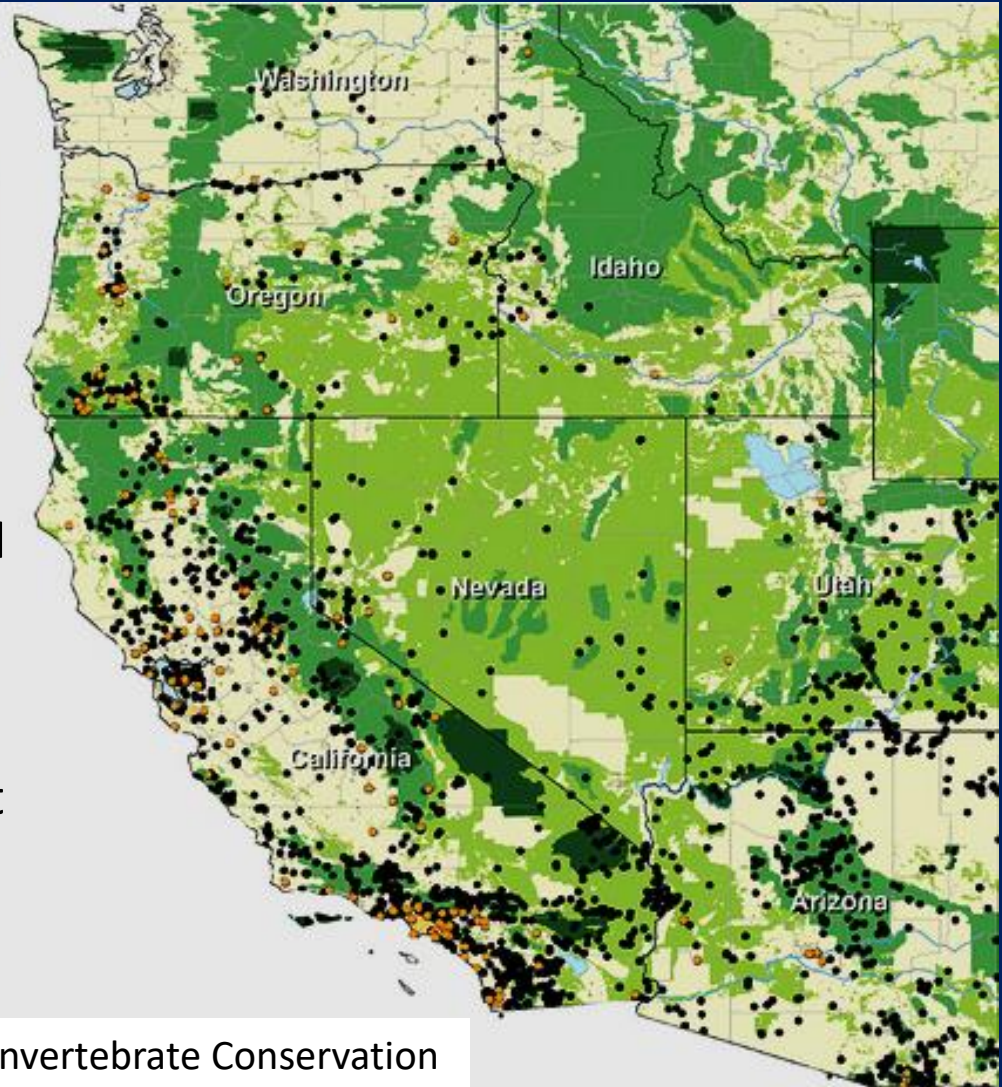


Milkweed & Monarch Breeding Grounds

Milkweed and monarch-breeding grounds in the West



Numerous factors may be causing fewer Monarchs to overwinter: loss of milkweed breeding grounds; increased pesticide use, and possible climate change. There is no single clear explanation. But it won't hurt to plant more milkweed and nectar plants for Monarchs.



Adapted from the Xerces Society for Invertebrate Conservation



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Pesticides Take Their Toll



Butterflies are very sensitive to chemical sprays used on farms and lawns. Many beneficial insects die this way.



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Land Development Destroys Habitat



Clearing land for farming or other development often destroys native plants and habitats.



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You Can Do Something

Plant a
butterfly
garden.
No garden
is too
small.



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Photo: <http://www.gardensdecor.com>

FFI: <http://www.cnps.org/cnps/grownative/habitat/butterflies.php>

Go Beyond Your Home

Do not limit your efforts to you own yard.
Go to other places in your community and help
them plant butterfly gardens.

- Schools & Libraries
- Community Centers & public buildings
- Hospitals & Nursing homes
- City, County, State and National Parks
- Street parkways and highway medians



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Use Native Plants

Here are some places to get help finding suitable CA native plants to help butterflies and other pollinators.

California Native Plant Society

www.cnps.org

Las Pilitas Nursery

www.laspilitas.com

Obsession with Butterflies

<http://www.obsessionwithbutterflies.com/gardening.html>



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More Monarch Butterfly Info

<https://www.monarch-butterfly.com/>

<https://www.monarchwatch.org/>

<https://www.nationalgeographic.com/animals/invertebrates/m/monarch-butterfly/>

[https://www.fs.fed.us/wildflowers/pollinators/Monarch Butterfly/migration/index.shtml](https://www.fs.fed.us/wildflowers/pollinators/Monarch_Butterfly/migration/index.shtml)

<http://monarchbutterflyusa.com/>



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Some Places to Visit



Search the Internet for other locations you can go to see Monarchs and other butterflies.



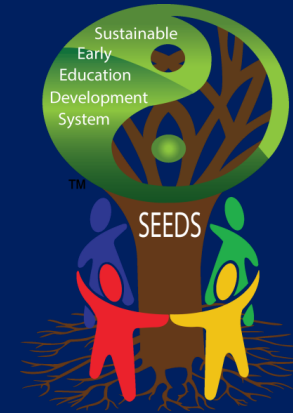
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For More Information



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